

Capacity Building Workshop on Spent Lead Acid Batteries and Electronic Waste

Greg Sampson
Earth Protection Services Inc

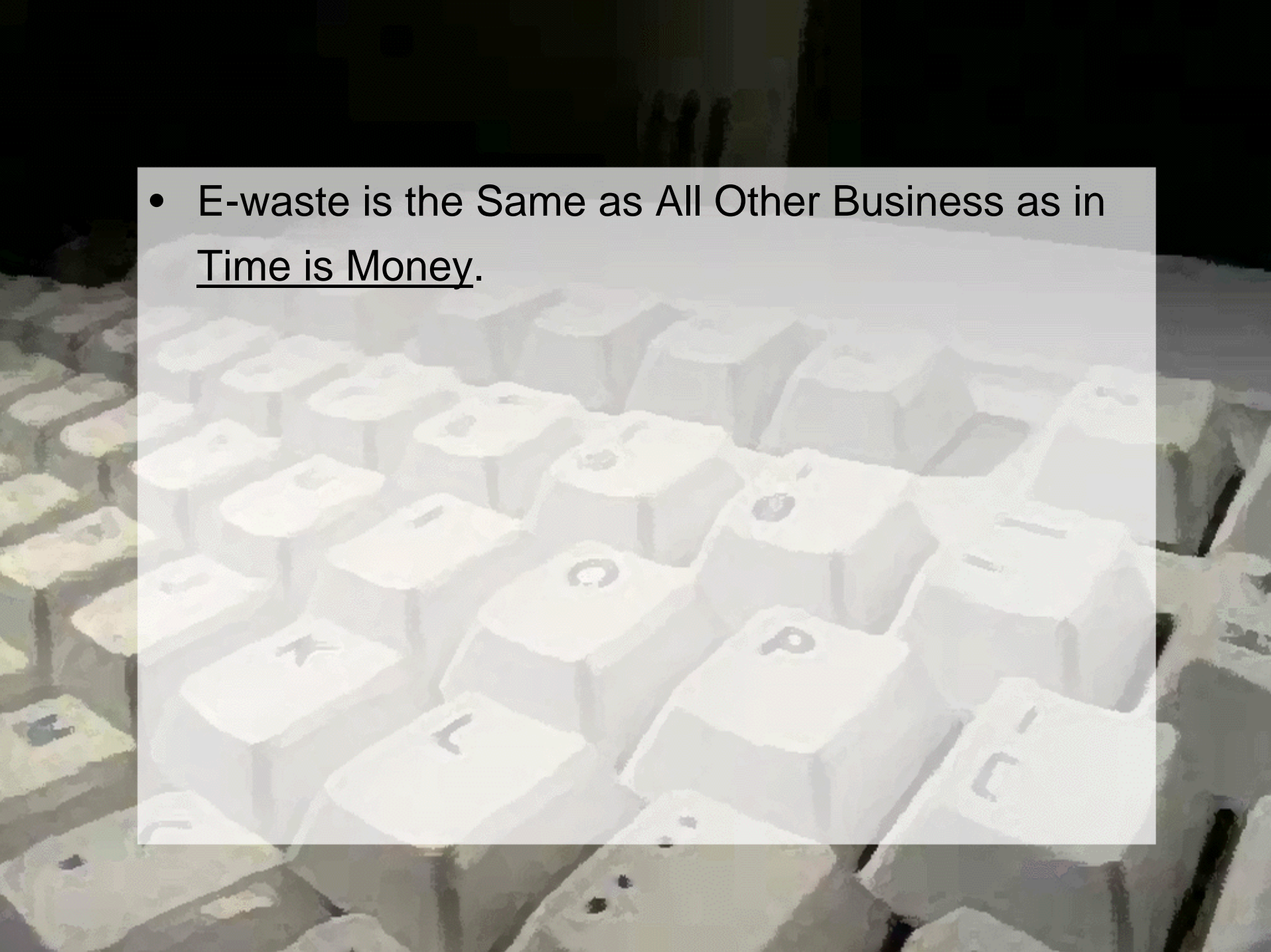
December, 4-6, 2007
Tijuana, Mexico

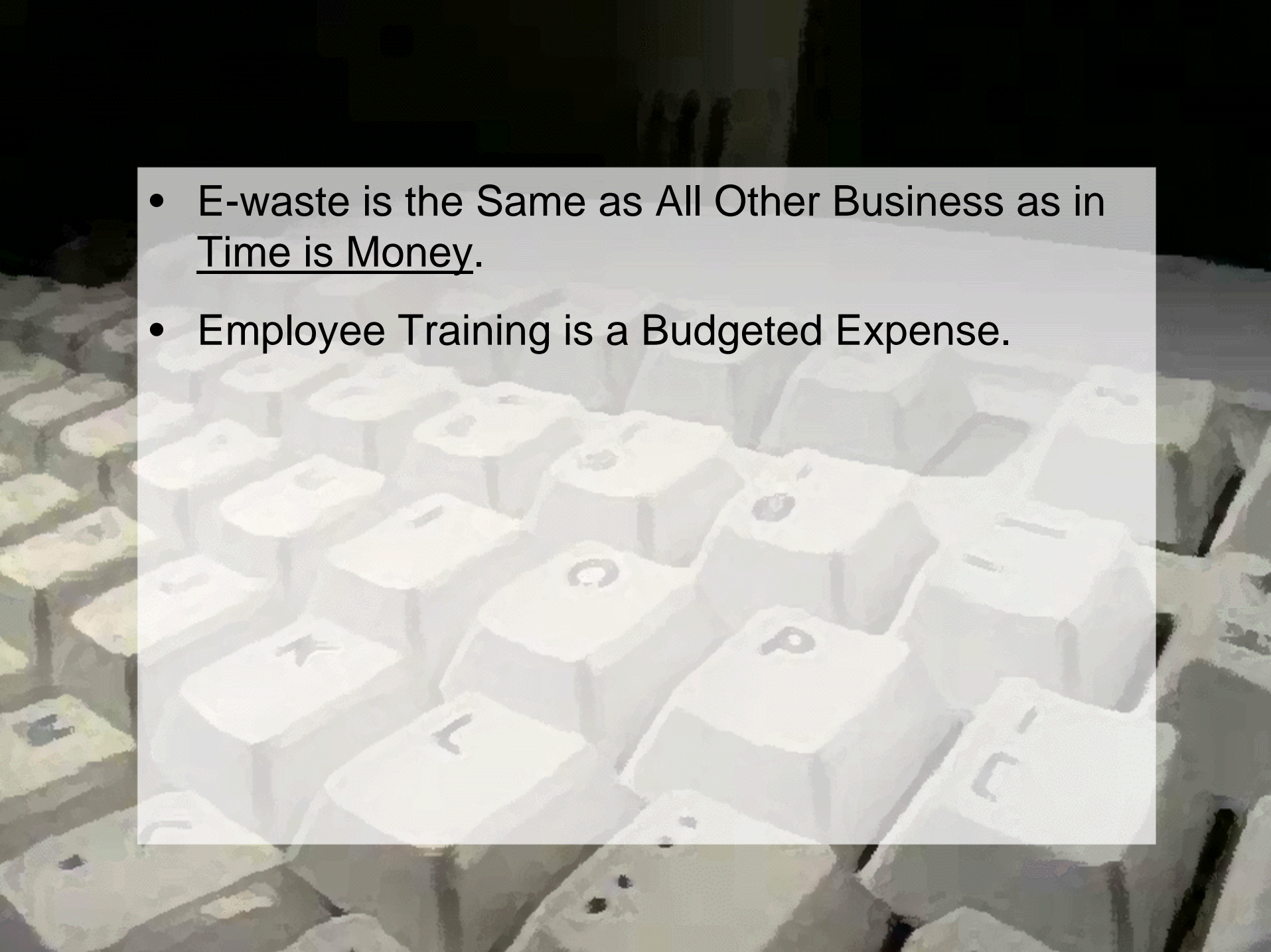
Introduction

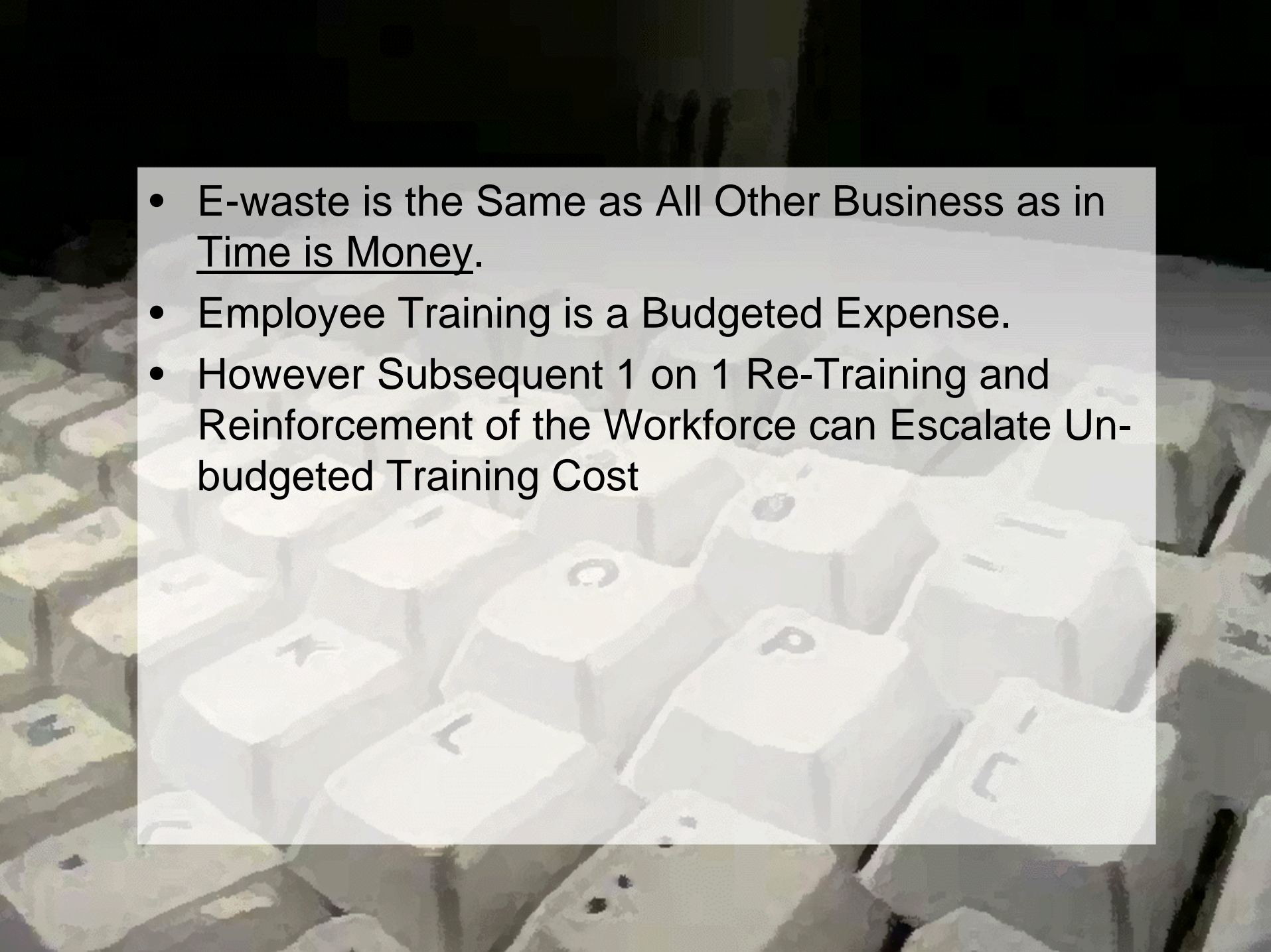
- *How To Demanufacture A Personal Computer Manual*
- Lamp Recycling



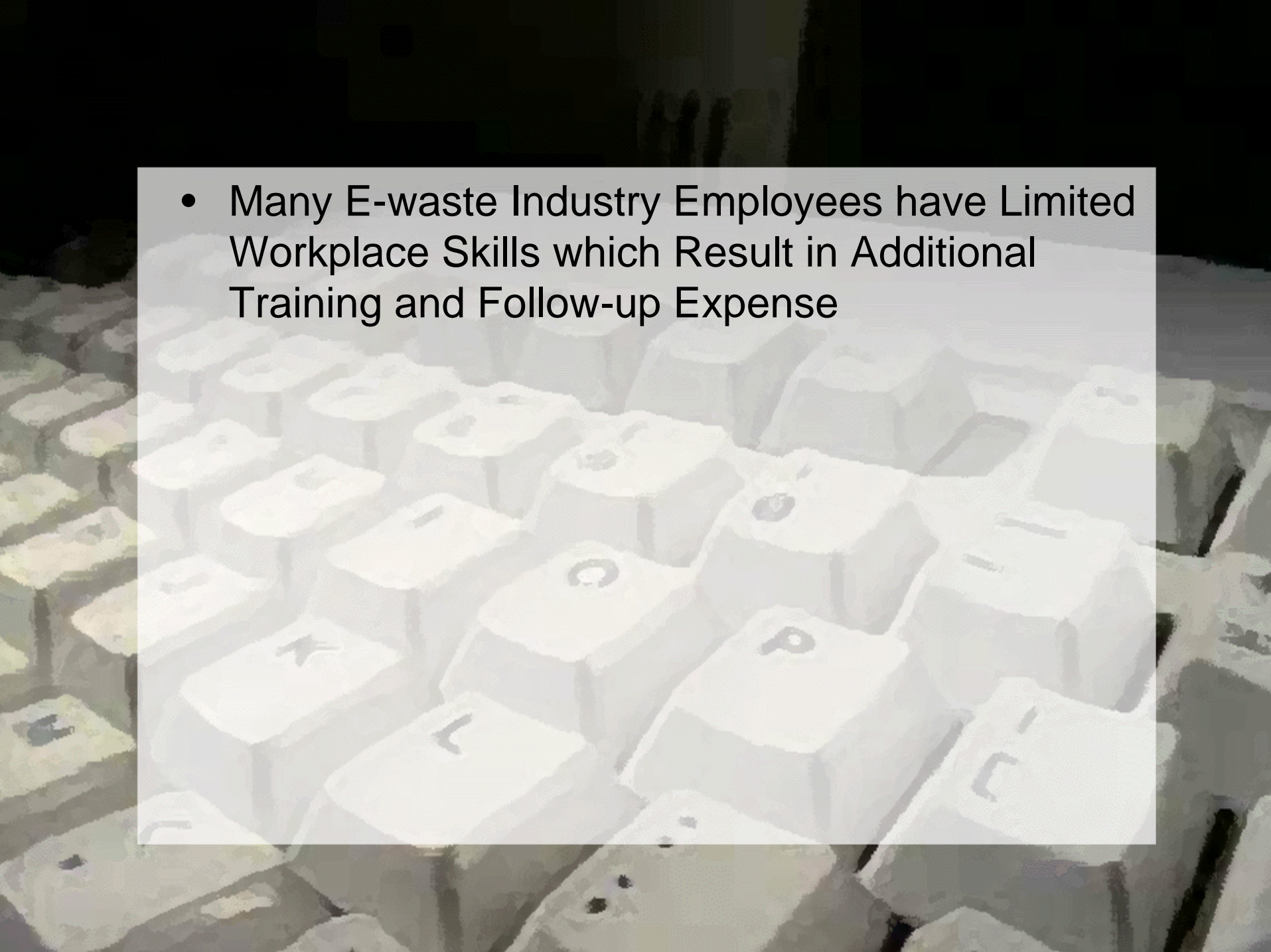
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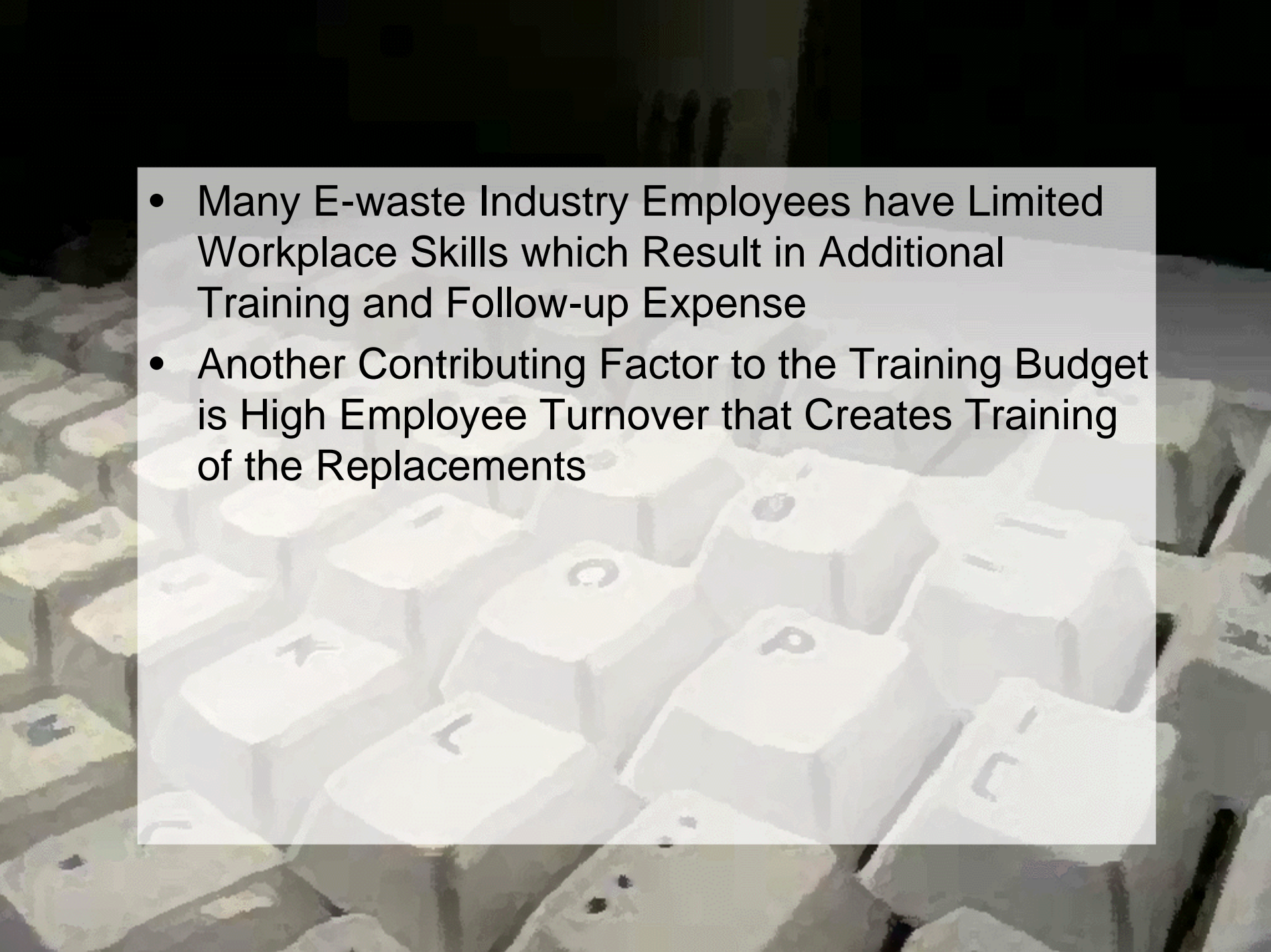


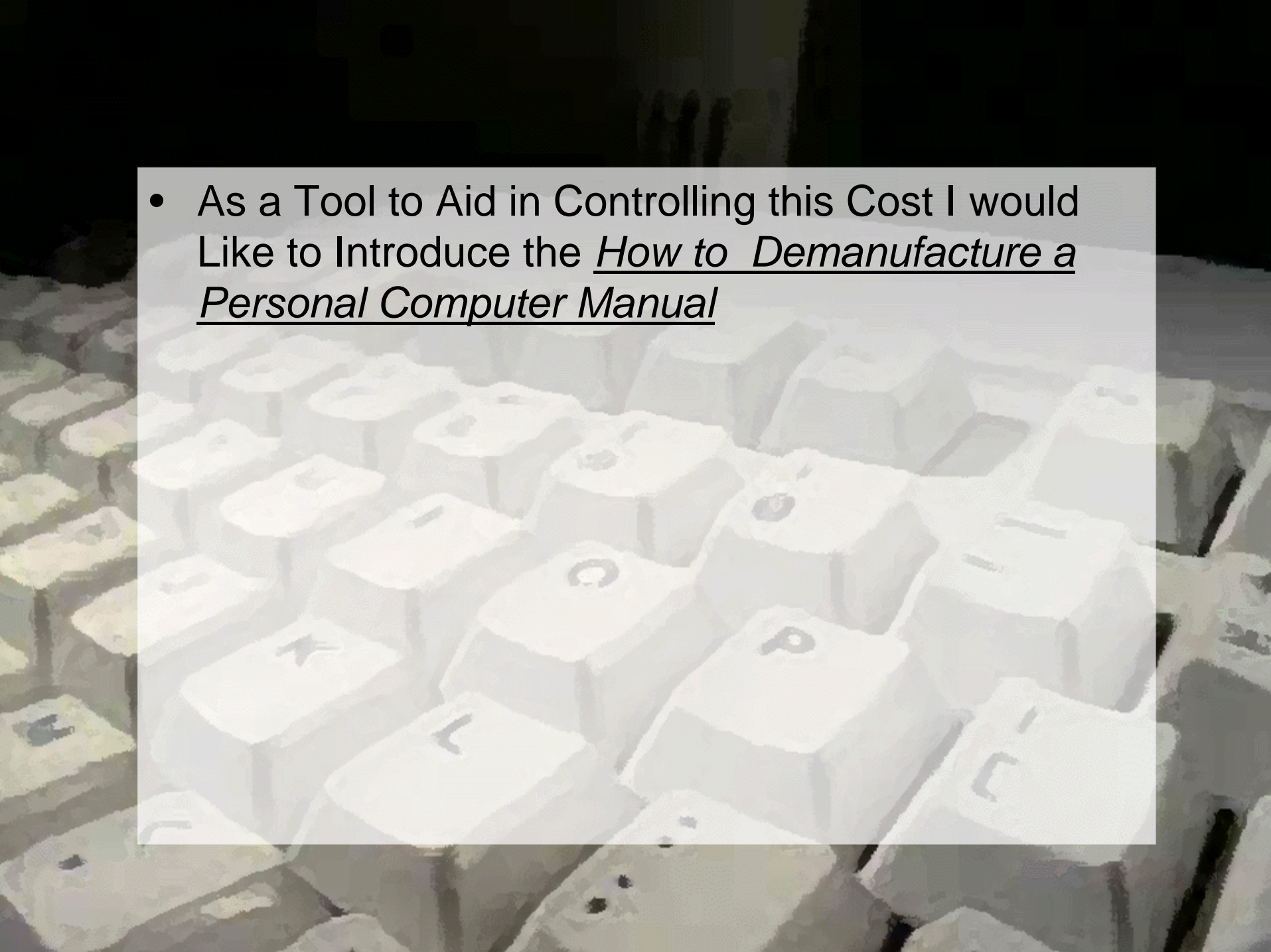
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 - Employee Training is a Budgeted Expense.

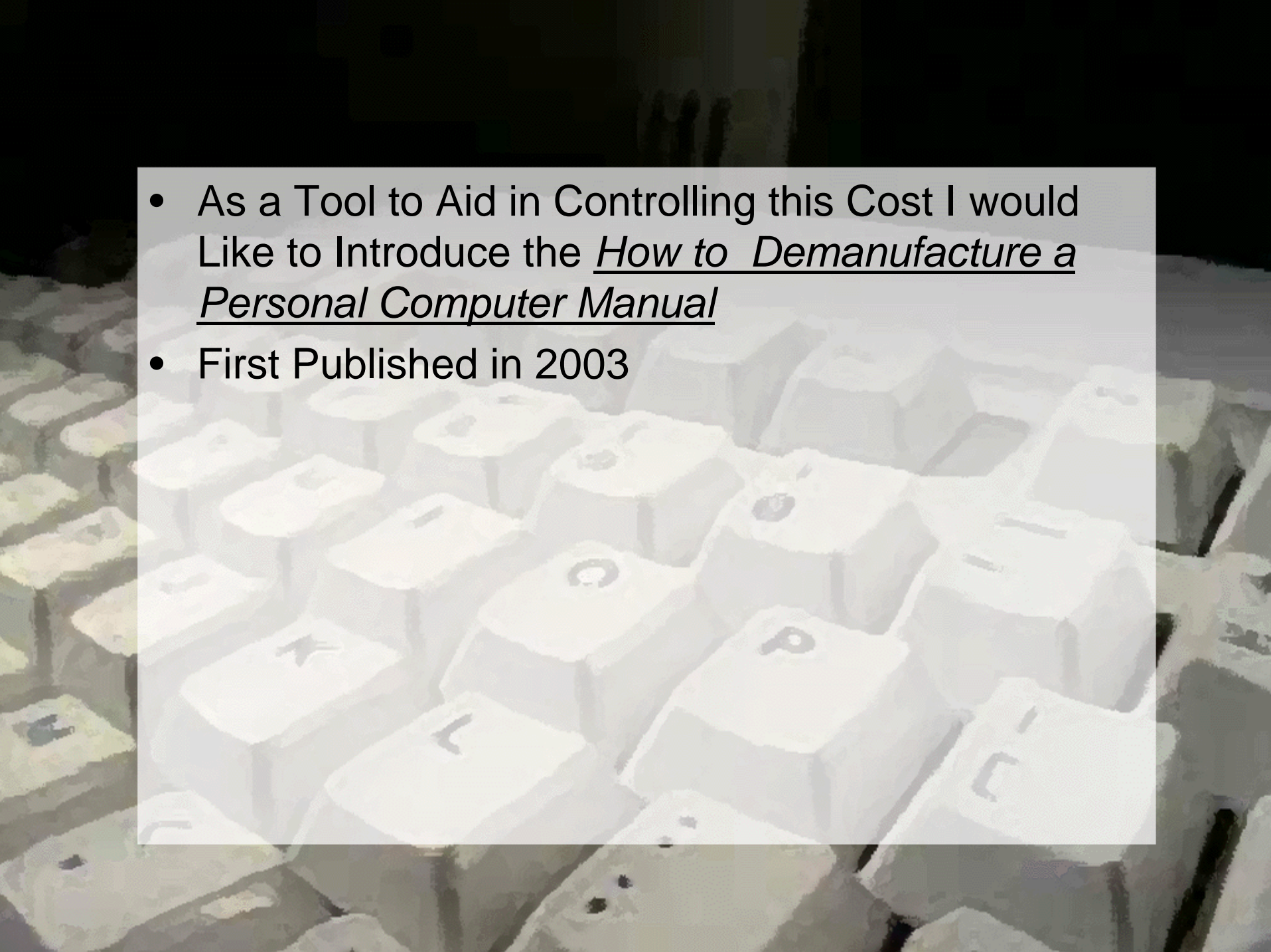
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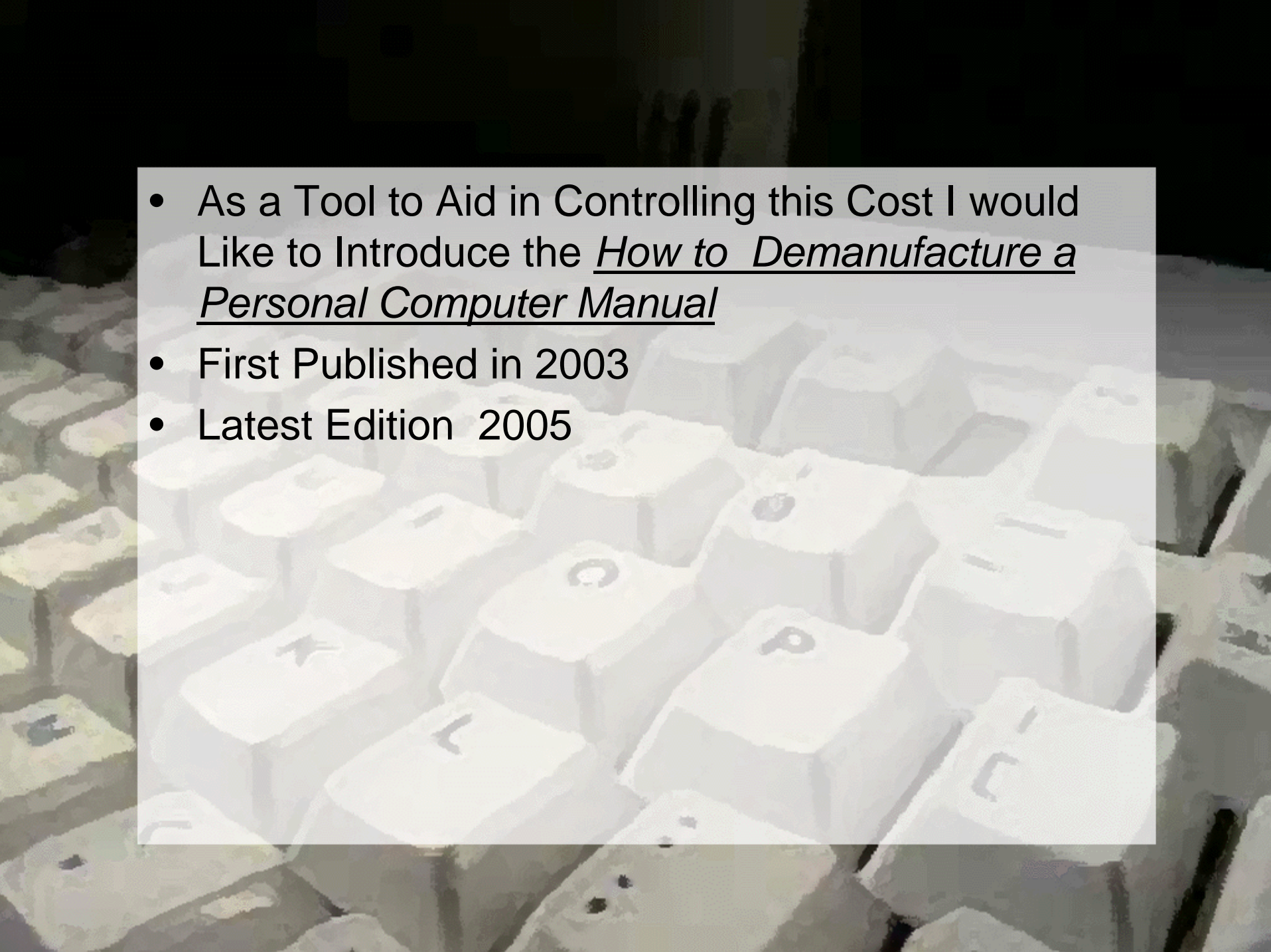
- E-waste is the Same as All Other Business as in Time is Money.
- Employee Training is a Budgeted Expense.
- However Subsequent 1 on 1 Re-Training and Reinforcement of the Workforce can Escalate Un-budgeted Training Cost
- The Quicker an Employee is Trained in the Assigned , the Quicker that Employee Begins to Produce the Desired Results for the Business

- 
- Many E-waste Industry Employees have Limited Workplace Skills which Result in Additional Training and Follow-up Expense

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 - Another Contributing Factor to the Training Budget is High Employee Turnover that Creates Training of the Replacements

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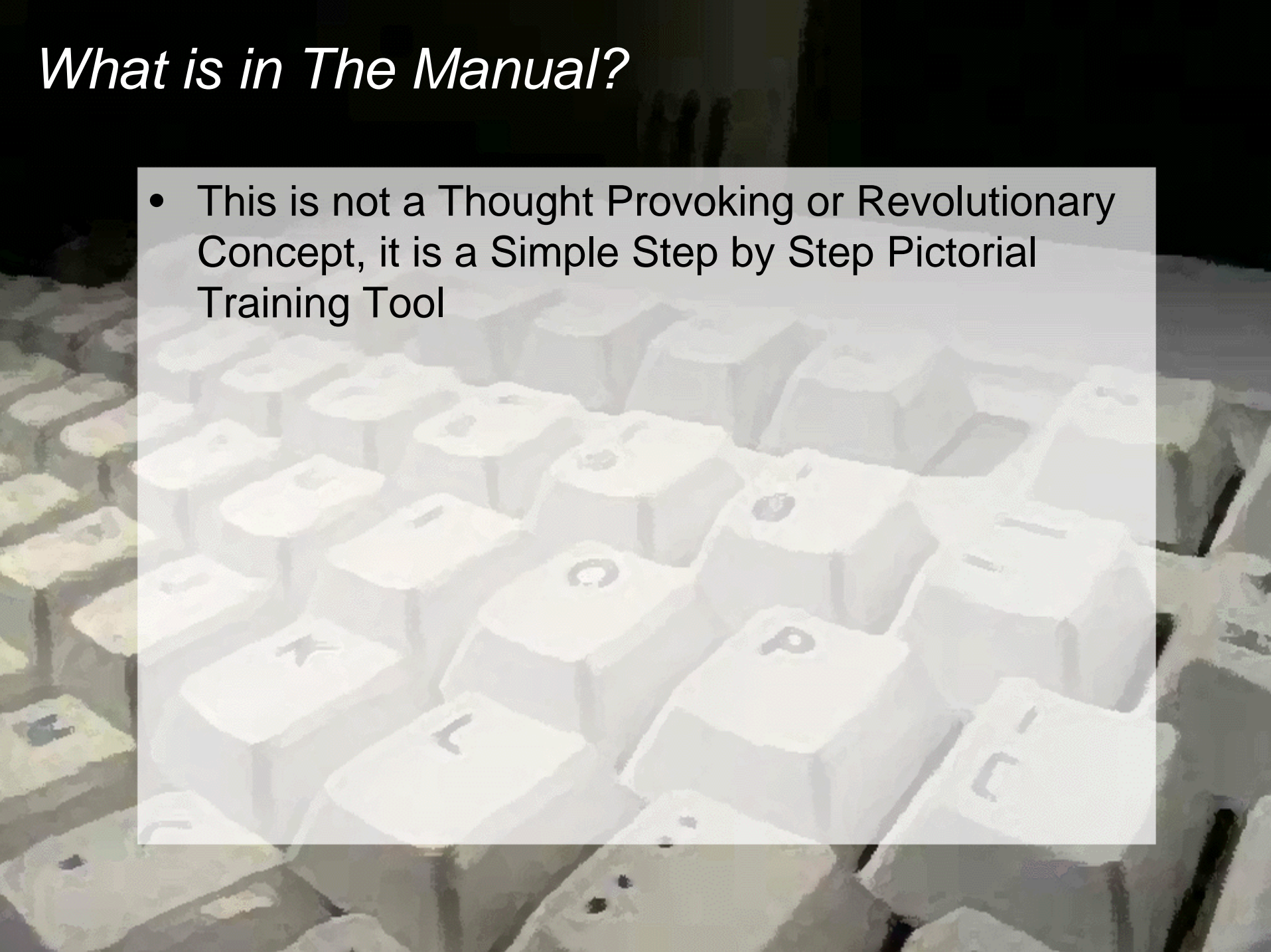
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- As a Tool to Aid in Controlling this Cost I would Like to Introduce the *How to Demanufacture a Personal Computer Manual*
 - First Published in 2003
 - Latest Edition 2005

How To Demanufacture A Personal Computer



What is in The Manual?

- This is not a Thought Provoking or Revolutionary Concept, it is a Simple Step by Step Pictorial Training Tool



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- This Frees Supervisory Personnel for Duties Other than Training

Sample Pages

Step3. Disconnecting the CRT from Circuit Board



Cut all Lead Wires from Circuit Board to CRT



Cut all Lead Wires *



Equalizing the Pressure in the CRT



Use a Hammer and a 1/8 Inch Punch

The CRT is a vacuum filled tube. By punching a hole in the metal contact point with either a hammer and punch or a drill and a 1/8 bit the pressure will equalize by allowing air into the tube

Releasing the Pressure will Make a Hissing Sound as Air Rushing into the CRT Equalizes the Pressure. The CRT is Not Releasing any Gases. It is a Vacuum Tube

CAUTION !!!

Equalize the pressure prior to completing any other steps

Wear all safety equipment
Handle the monitor with care

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What's within a computer and monitor?

The following is a brief overview of some of the dangers within (when exposed to the item in its pure unrefined state). **Please note, the following have been combined in processes with other elements and products which greatly minimizes the danger of risk exposure and harm in its present form as a computer or monitor.** The exposure risk increases in the downstream reclamation processes such as shredding, grinding, and separation of the finished product into the basic commodities. Simple de-manufacturing (taking apart a computer and handling each component) is a safe process.

1 BARIUM

A metal used in the monitor's front panel, situated behind the screen. Prolonged exposure can cause intestinal illness and muscular weakness.

2 BERYLLIUM

A grayish metal on printed circuit boards and components. Prolonged exposure can damage bones and lungs and potentially cause cancer.

3 BROMINATED FLAME RETARDANTS

Chemicals used to reduce the risk of fire. Components are known endocrine disruptors.

4

Lead in Solder used in the monitor's front panel, situated behind the screen. Prolonged exposure can cause intestinal illness and muscular weakness.



Pull the IDE Cable Straight Out and Remove



IDE Cable Plug

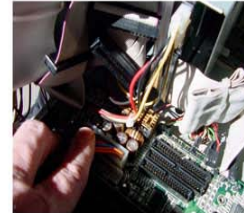


Remove any Wires or Cables Connected to Mother Board

6

What About All the Different Models ?

- Brands and Models Changes as Quickly as the Price of Gasoline



Grasp the Power Supply Plug on the Mother Board and Apply Pressure to the Locking Clip to Release the Plug



While Holding Pressure on the Locking Clip Pull Straight Upward and remove the Plug



SAFETY

...ish and mammals, some of the retardants' ... can

6. LEAD

... and galvanized steel plates from corrosion; Short-term exposure can irritate skin to Hexavalent ... and long-term prolonged unprotected exposure can damage liver, kidney and nerve tissues and cancer.

7. MERCURY

Cathode ray tubes contain between 4 and 7 pounds of lead to shield against radiation. This lead is glass encapsulated in glass just as the lead in a fine crystal drinking glass and is safe. Chronic exposure to unshielded lead has been linked to vascular and kidney disease.

8. PHOSPHOR

In batteries, switches and circuit boards. Short-term exposure can cause kidney damage.

Coats the interior of the monitor screen and exposure may cause skin, eye and stomach irritation with direct long term contact.

9. PLASTICS

A computer weighing 60 pounds has about 14 pounds of plastic. Older computers contain a plastic made of polyvinyl chloride (PVC), which generates toxic substances when burned. Manufactures are beginning phasing out PVC.

What About All the Different Models ?

- Brands and Models Changes as Quickly as the Price of Gasoline
- The Illustrations are Generic Examples to Serve as a Self Guided Tutorial



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Where is the Manual Used ?

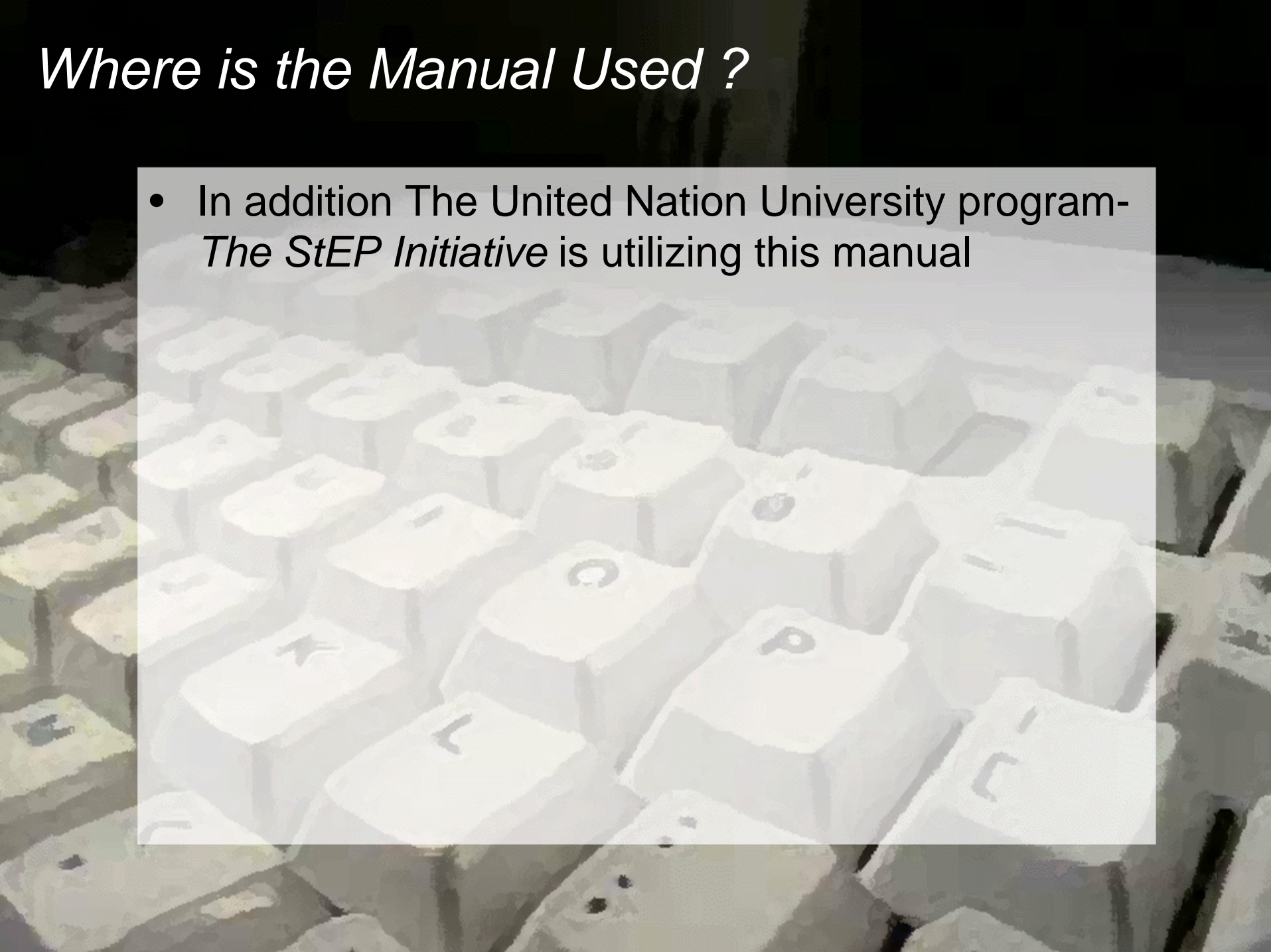
- Linn Benton Community College in a Work Skills Training Classes

Where is the Manual Used ?

- Linn Benton Community College in a Work Skills Training Classes
- Numerous (NGOs) Non- Profits and For Profits Companies throughout the US and recently in Canada

Where is the Manual Used ?

- In addition The United Nation University program-
The StEP Initiative is utilizing this manual



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- *StEP* is an acronym for *Solving the E-waste Problem* on a Global Scale

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- *StEP* is an acronym for *Solving the E-waste Problem* on a Global Scale
- Along with *Step*, the European Division of *HP* is currently using the manual in *HP* training programs in India and Africa and purchased the EU copyrights of the Manual

Manual Availability

- 20 Manuals Available at the Conference- 15 in Spanish and 5 in English

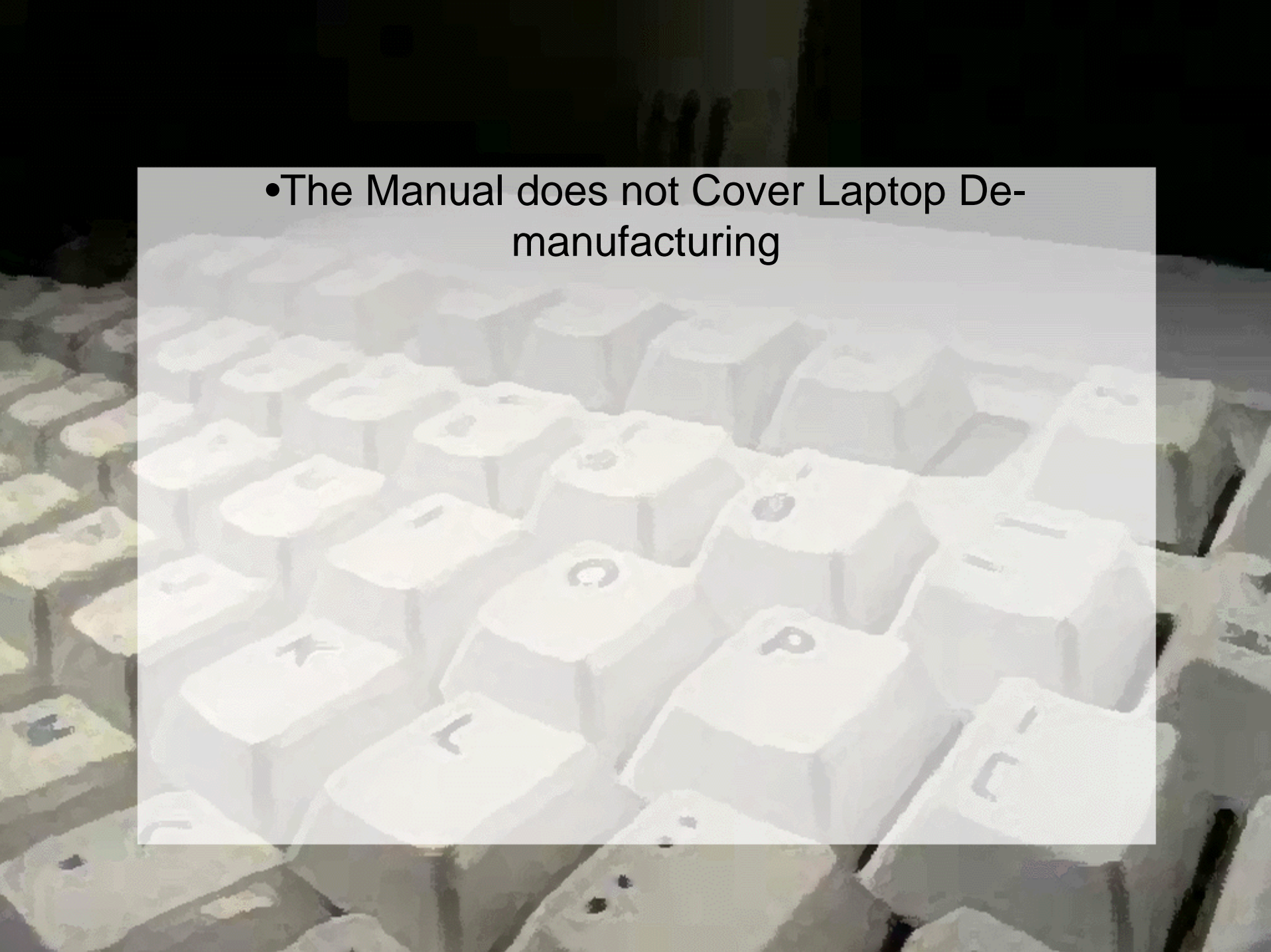
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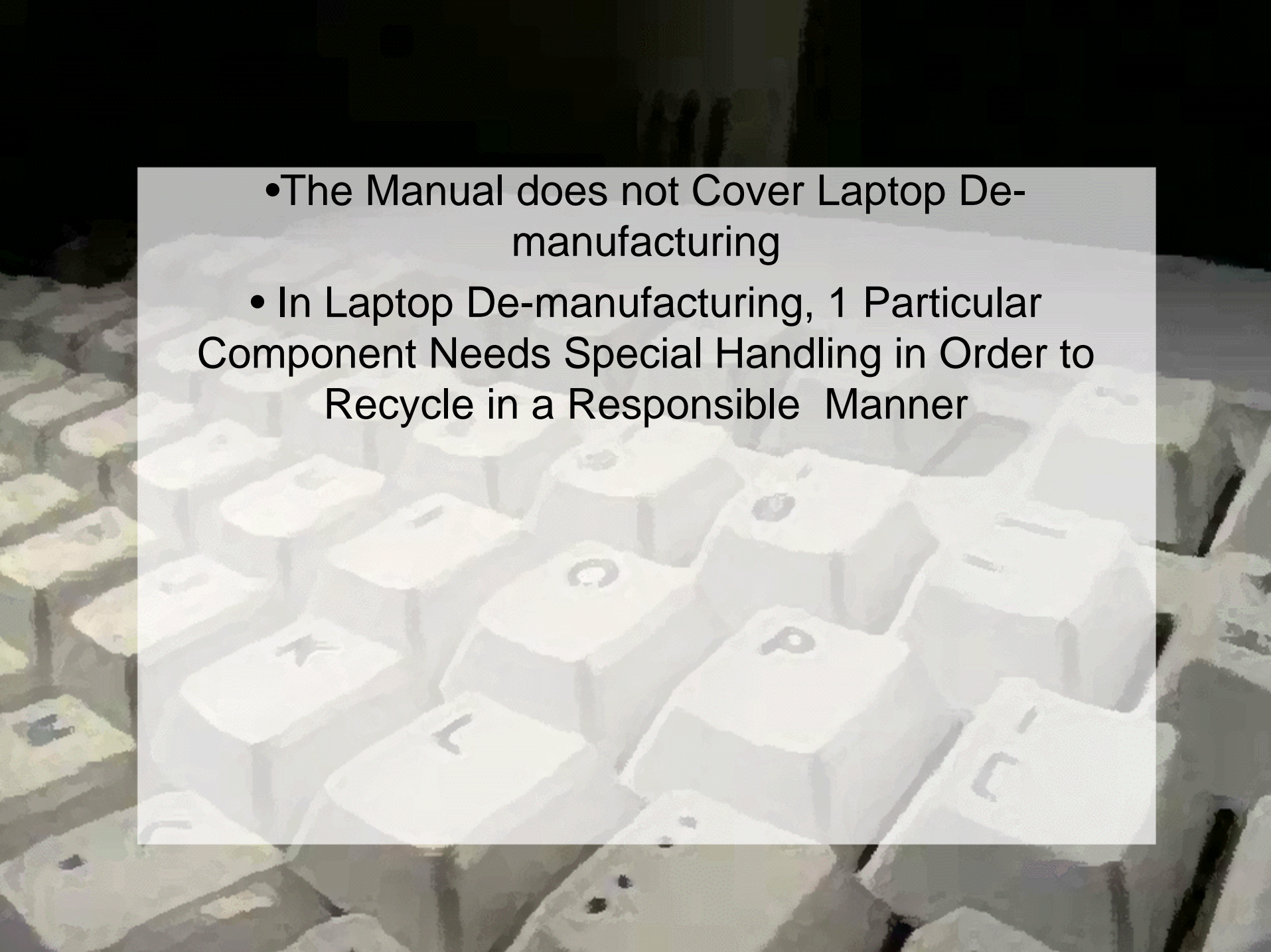
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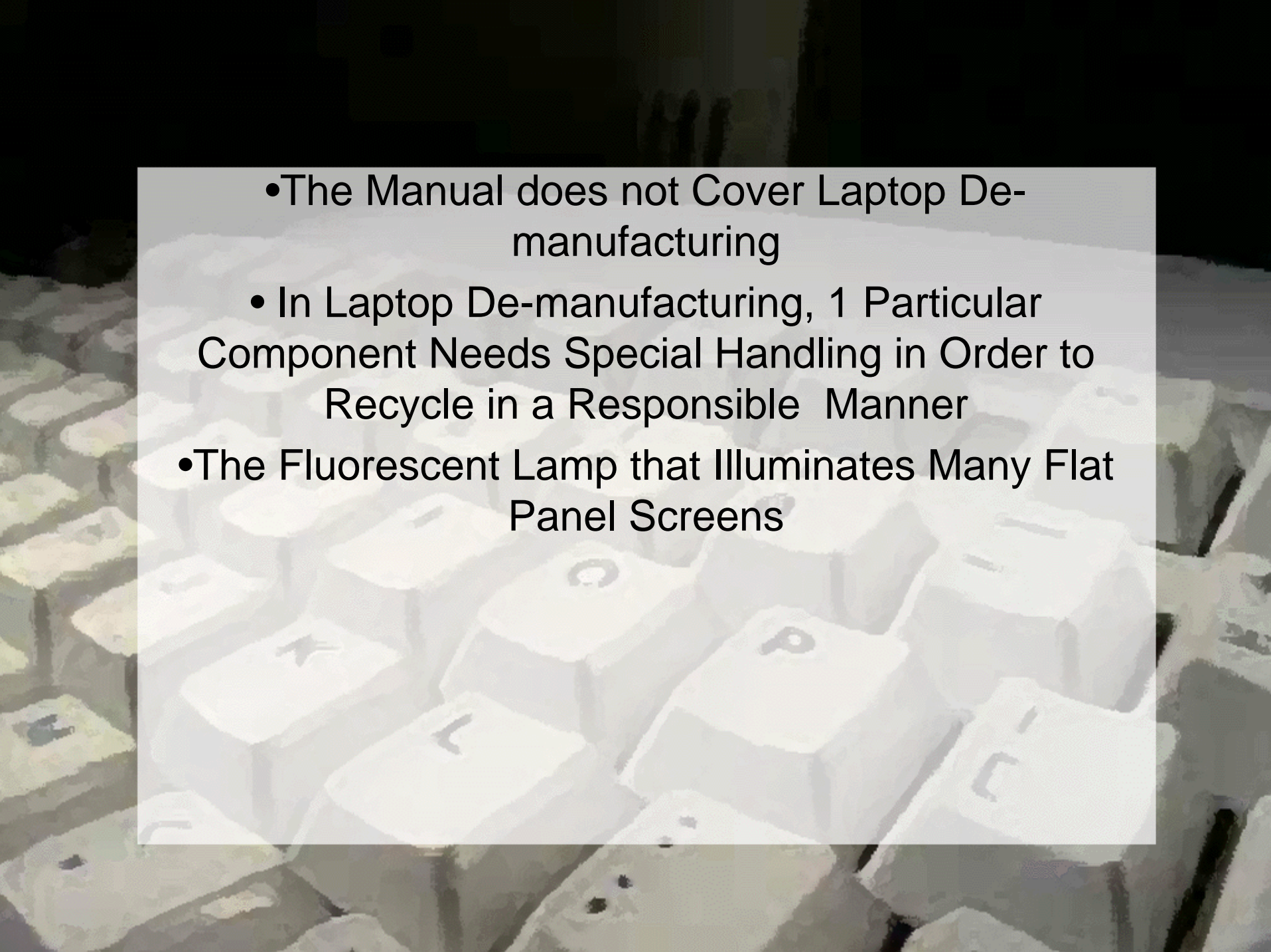
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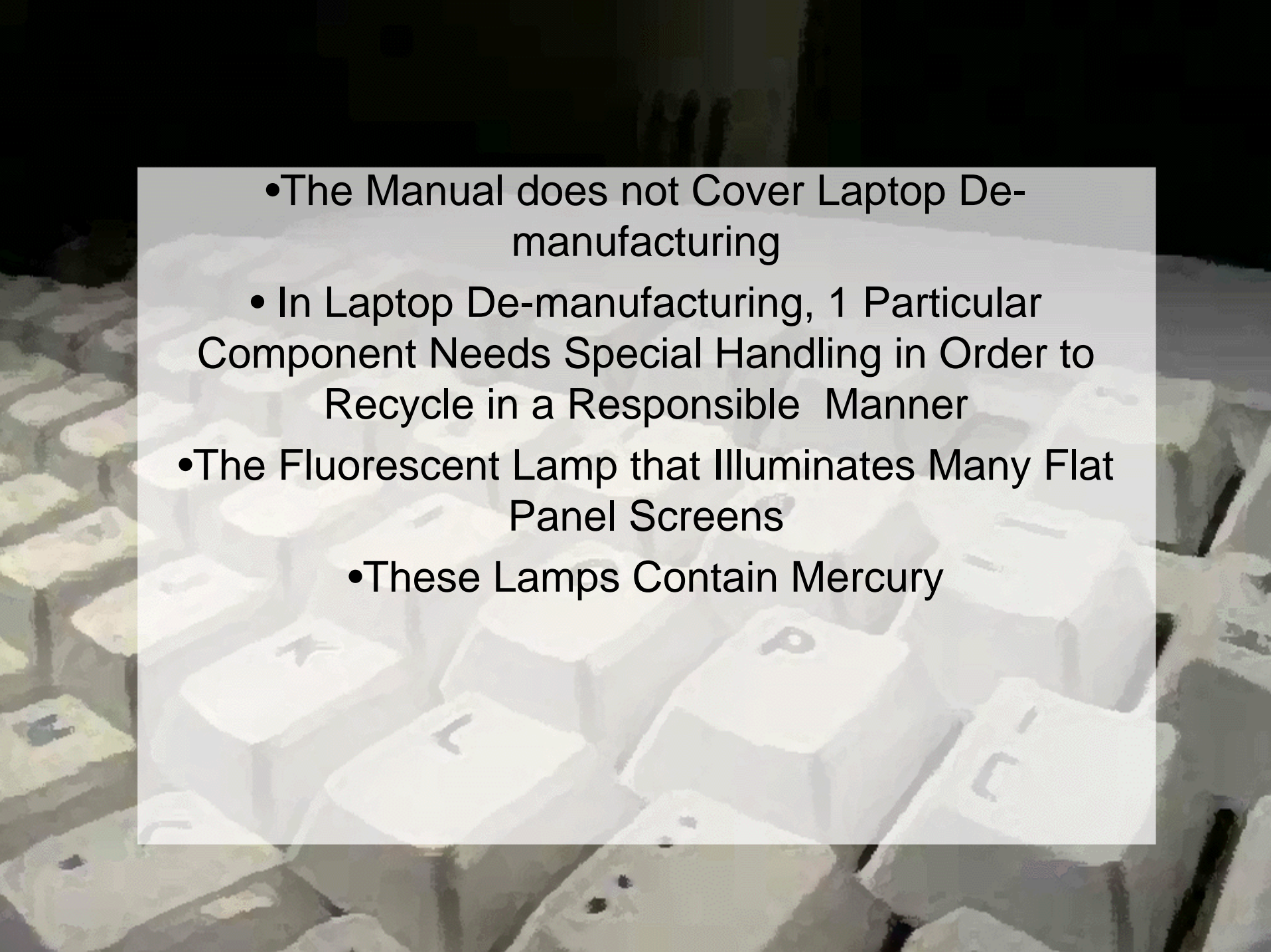
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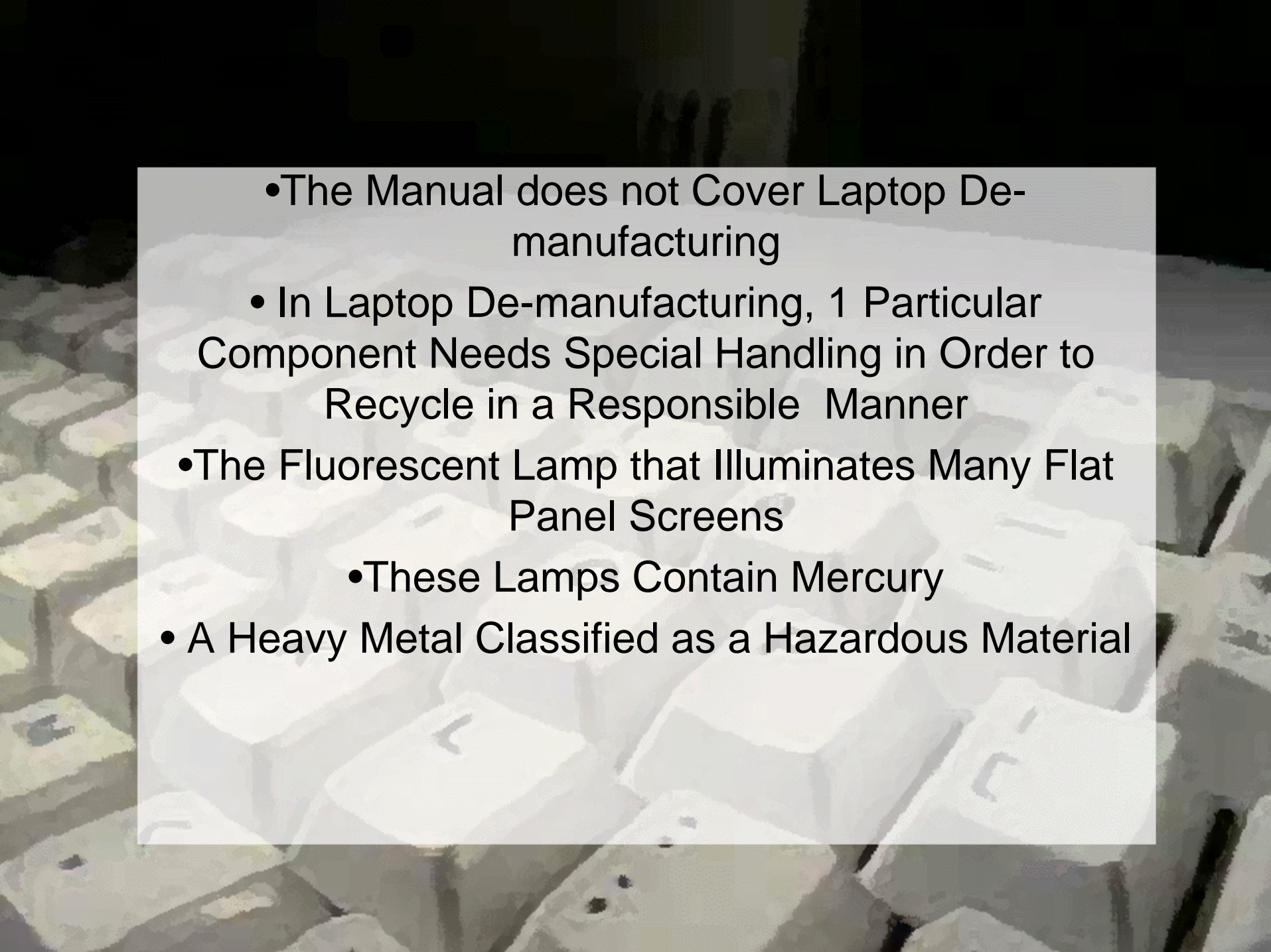
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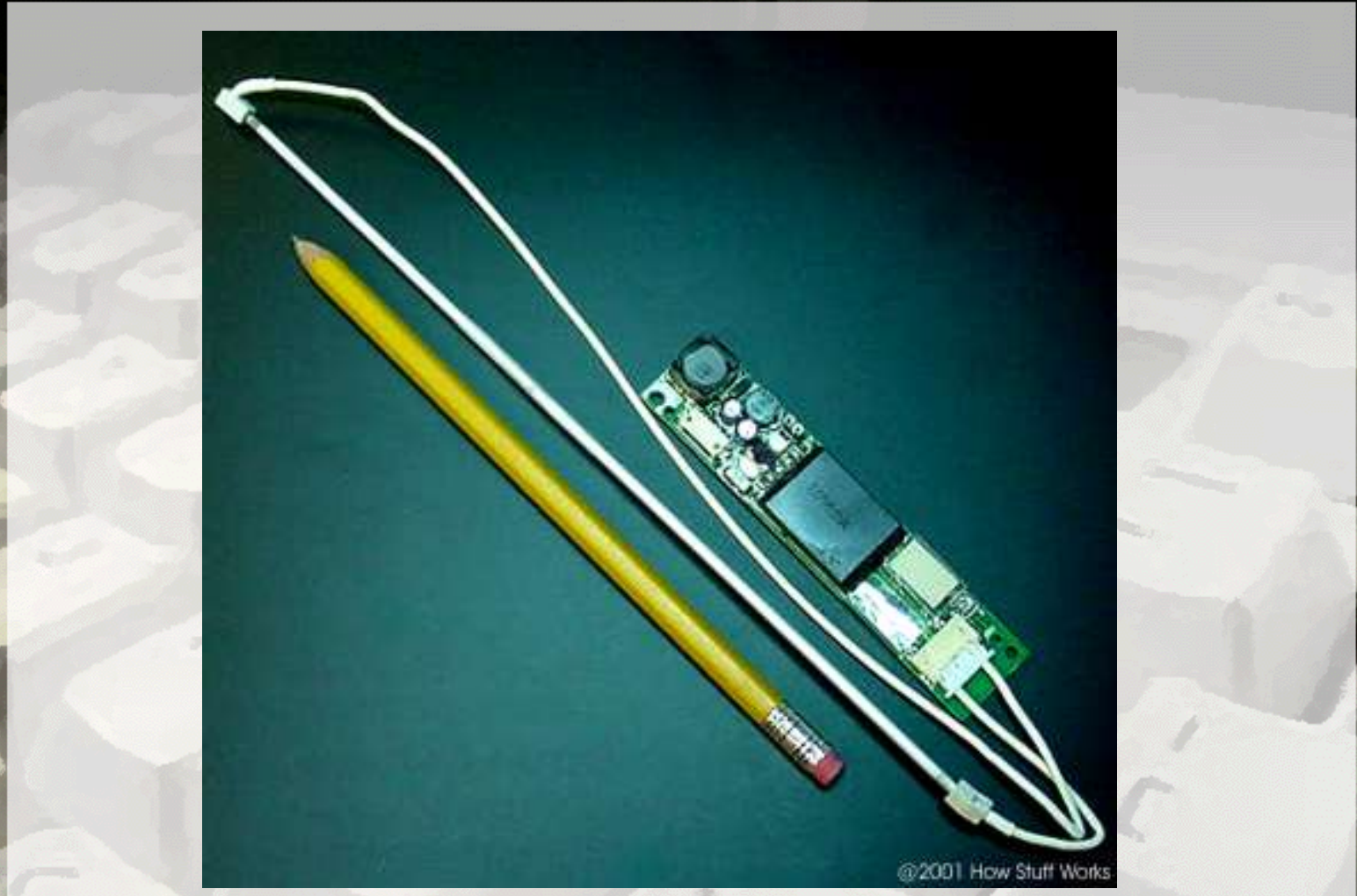
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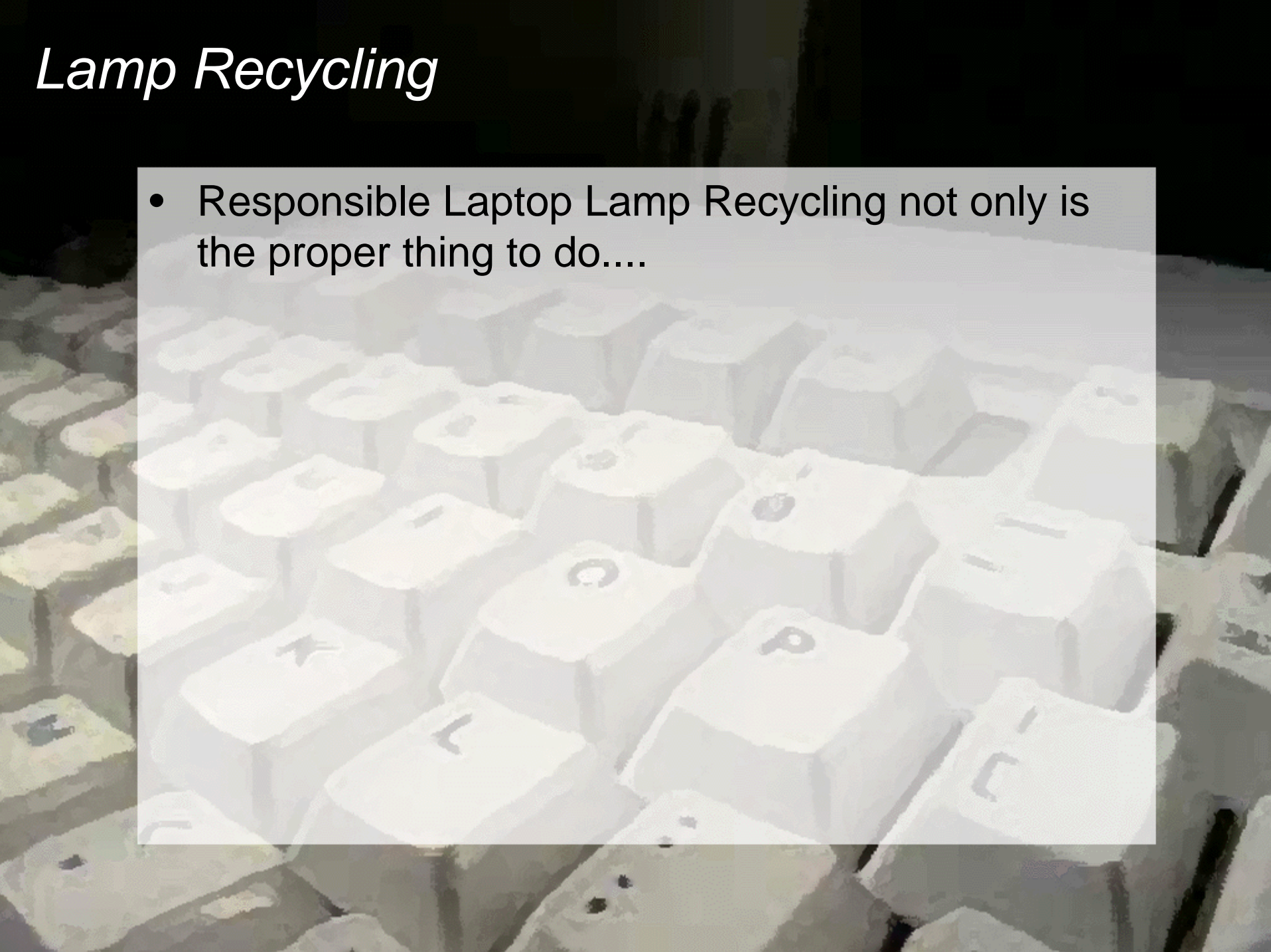
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- The background of the slide is a close-up, slightly blurred image of a laptop keyboard. The keys are visible in various shades of grey and white, creating a textured, geometric pattern. The lighting is soft, highlighting the edges of the keys.
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 - The Fluorescent Lamp that Illuminates Many Flat Panel Screens
 - These Lamps Contain Mercury
 - A Heavy Metal Classified as a Hazardous Material

What Does the Laptop Lamp Look Like?



Lamp Recycling

- Responsible Laptop Lamp Recycling not only is the proper thing to do....



Lamp Recycling

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- It can Lead to Add-On Business
- Many Companies that are Concerned About Appropriate E-waste Recycling are also want to Recycle Lamps Correctly
- These Companies Need A Business to Take Care of Lamps Correctly

Recycling & Risk Management of End-of-Life Lighting Products

Topics

- What Lamps are Covered
- Collection Options
- Lamp Recycling Process
- Downstream Process
- Due Diligence & End Markets
- UW Training



How Much Mercury Does it Take?



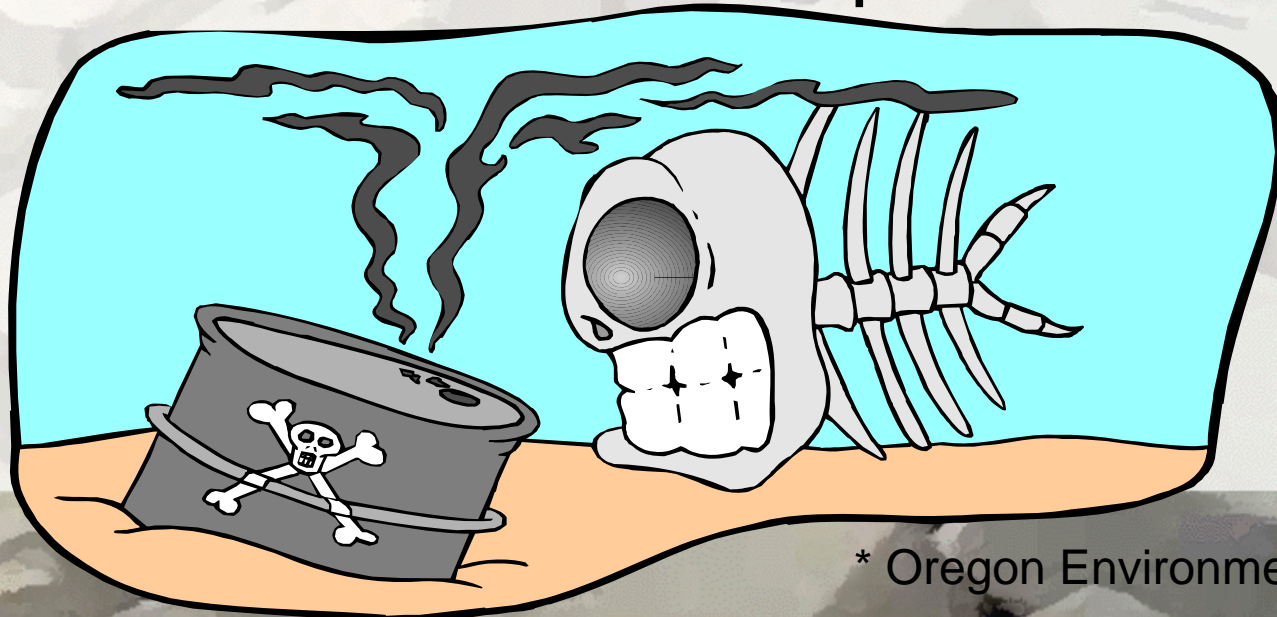
How Much Mercury Does it Take?

“The Amount of Mercury Contained in just 25 Four Foot Standard Fluorescent lamps Can Pollute a 20 Acre Lake, Rendering **All Wildlife Unfit** For Human Consumption”*

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- As of February 8th, 2006, in California, **all fluorescent lamps and tubes** must be recycled, taken to a household hazardous waste disposal facility, or taken to a universal waste handler or an authorized recycling facility.



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- A typical fluorescent lamp is composed of a Phosphor-coated glass tube with electrodes located at either end. The lamp contains Mercury, of which a very small amount is in vapor form.



Regulated Lamp Disposal

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- Be Ready with a Downstream Recycler to Handle the Mercury Recovery
- Be Ahead of the Competition

Lamp Collection Options

- Recycler Pickup



**All Collection Options must comply with Department of Transportation /
Universal Waste Requirements
Regarding Storage, Packaging and Transportation.**

Lamp Collection Options

- Recycler Pickup
- Customer Delivery to Recycler



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- Recycler Pickup
- Customer Delivery to Recycler
- Municipal Collection Events



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Lamp Collection Options

- Recycler Pickup
- Customer Delivery to Recycler
- Municipal Collection Events
- Pre-Paid Shipping Containers (US Only)



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Lamp Recycling Process

Materials Transported to Lamp
Recycler



Lamp Recycling Process

Materials Transported to Lamp Recycler

- Items are Disassembled & Separated



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- Virtually All Parts are Recycled
- Sold for Re-use (cardboard boxes)



Lamp Recycling Process

Materials Transported to Lamp Recycler

- Items are Disassembled & Separated
- Any Hazardous Materials are Safely Removed & Handled
- Virtually All Parts are Recycled
- Sold for Re-use (cardboard boxes)
- Melted Down (glass, aluminum, copper, steel)



Lamp Recycling Process

Separate Glass,
Phosphor & Metals



Lamp Recycling Process

Separate Glass,
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Phosphor is “Retorted” and
Dried into a Powder



Lamp Recycling Process

Mercury is Removed From
the Lamps & Purified



Lamp Recycling Process

Mercury is Removed From
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Metal Parts are Separated &
Sent to be Melted & Reused

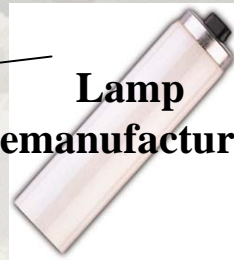


Spent Lighting Materials Flowchart

Customer / Generator Whole Lamps
Transported to EPSI Demanufacturing Facility



Lamp
Demanufacturing



Lamp Recycling Process

Aluminum
Endcaps



Glass



Glass Recycler



Mercury &
Phosphor
Powder

Retort



Secondary Metals
Market

Mercury



Disposed As
Non
Hazardous
Waste

Certificate
of Proper
Disposal

*Certified Destruction
Completes
Audit Trail
& Chain of Custody*

Downstream Process

Liquid Lamp Mercury

- Triple-Distillation by Permitted Environmental Company

Downstream
Vendors
Audited
Every Three
Years

Downstream Process

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Phosphor Powder

- TCLP Analysis for Mercury
- Class I Permitted Secure Landfill

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Aluminum End Caps

- Secondary Metals Market

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The recovery service provider must perform due diligence and have documentation regarding end-use markets.

Due Diligence & End Markets



Are You Sure How Your Lamps Are Recycled?

Due Diligence & End Markets

A service provider should be able to provide an overview of their procedures for:

- Demanufacturing
- Disposal and waste handling
- Storage

Due Diligence & End Markets

Things to Look For in A Recycling Service Provider:

- Experience & Expertise

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- Environmental Protection
- Financial Safeguards
- High Levels of Insurance

Due Diligence & End Markets

Things to Look For in A Recycling Service Provider:

- Recycler or broker of materials

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- Consulting Support & Subcontractor Training on Proper Lamp Handling Procedures

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- Recycling Permits (Federal / State)

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- Customer Indemnification

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- Strong Financials
- \$5,000,000 Pollution Liability Insurance Naming Customer as Additionally Insured

Universal Waste Training

Procedure for handling unbroken fluorescent lamps for recycling:

Employee will wear the following safety equipment.

- Gloves made of leather, or equivalent.
- Safety glasses with side shields or full face shield.
- Safety toed shoes or boots.

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Place lamps into new or used lamp boxes (the original egg crate material does not have to be placed back into the boxes) and tape the ends shut.

- Broken or crushed lamps should be packaged in an approved container, (55 gallon drum).
- Badly damaged boxes, wet boxes, etc. will not be accepted for transport.
- Boxes must be kept in a secure, dry area.
- Palletize lamp boxes to a maximum height of 6 feet.
- Secure boxes to pallet with shrink wrap or stretch film.

Universal Waste Training

Procedure for handling unbroken fluorescent lamps for recycling:

Employee will wear the following safety equipment.

- Gloves made of leather, or equivalent.
- Safety glasses with side shields or full face shield.
- Safety toed shoes or boots.

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All pallets need to be labeled as Used Mercury Lamps or Universal Waste Mercury Lamps.

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Employee's shall wash his/her hands with soap and water when beginning a work shift, before a break, and upon completion of the work shift.

- The proper use of the prescribed safety equipment will protect the employee from the potential dangers of contamination from mercury.
- No tobacco materials, food, or beverages will be permitted while working with mercury lamps.

Contact Information

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